Section 11 - Draft Implementation Plan

11.1. Introduction

The previous sections of this document provided the conceptual and design basis for moving forward with the national monitoring strategy. This section provides a summary of the actions that will effect transition from design to implementation. The implementation plan incorporates action oriented components of the Strategy (e.g., regulations revisions [section 11.2] and training [section 11.4], and introduces a funding strategy [section 11.4] and outreach approaches [section 11.5] to facilitate NCore implementation.

11.2. Monitoring Regulations

The monitoring regulations establish a referenceable body that codifies many elements of the Strategy. In addition to providing a legal basis for moving forward, the regulations embody a number of "obstacle-removing" sections that alleviate some of the unnecessary burdens faced by monitoring agencies, and enhance the ability to introduce new technologies into our networks.

- **Codification of NCore**. The regulations introduce the NCore system of multiple tiered monitoring stations that replace the current NAMS/SLAMS nomenclature.

- **Adjustment of minimum requirements for specific pollutant measurements.** Generally, the monitoring regulations require far fewer monitors than currently operated by SLTs. The $PM_{2.5}$ network is an exception as the vast majority of the nearly 1100 $PM_{2.5}$ FRMs were required under the 1997 regulations. The proposed revisions reduce the level of required FRMs substantially, allowing the introduction of more continuous $PM_{2.5}$ instruments.

- **New methods performance specifications.** Performance requirements that new PM mass methods must meet to establish national equivalency approval are based on utilizing the DQO process. The DQO approach provides an objective basis for defining performance requirements based on a combination of historical instrument performance and acceptable data quality. The regulations also introduce "regionally approved methods" which allows for the acceptance of continuous PM methods in airsheds where the behavior of instruments is well understood and clear quantitative association with FRM is demonstrated.

- **Periodic network assessments.** Requirements for periodic review of the relevancy of networks in meeting current objectives are included in the regulations. Previously, network reviews focused on meeting historically established monitoring objectives with primary focus on NAAQS. In NCore there is a need for periodic network assessments to evaluate whether the network is achieving all NCore monitoring objectives.

- **New QA procedures**. Section 7 provides details on the major changes made to the QA regulations found in 40 CFR Part 58 Appendix A.

11.3 Resource and Funding Strategy

The Strategy implies moving resources from programs of decreasing value to those of higher value, consistent with the principles presented in Section 1 (respecting the strong partnership across EPA and SLTs, retaining stability for the monitoring programs and accommodating SLT flexibility). The incoming assumption of a "zero-sum" constraint implies a reconfiguration of monitoring networks in contrast to the layering process accompanying deployment of the PAMS and $PM_{2.5}$ networks through the 1990's and early 2000's. Accordingly, this Strategy must rely on tailoring the current workforce in SLTs to accommodate a range of new technologies, implying a shift in skill sets from labor intensive integrated methods toward more technologically challenging continuous systems with enhanced data transmission and access capabilities. Attending this shift in skill sets is a need for adequate resources devoted to training, quality assurance and data analysis and interpretation.

The following discussion summarizes the current state of resources allocated for monitoring, and provides an example mapping of resource redistributions which follow the basic technical recommendations of the Strategy.

11.3.1 Implementation Using Current Funding Basis

Monitoring operations performed by SLTs are supported by Section 103 and 105 STAG funds. Table 11-1 provides estimates of the annual funding allocation over the last three years across air monitoring networks, and Table 11-2 provides a more detailed breakdown of the $PM_{2.5}$ budget. The first three networks (toxics, $PM_{2.5}$ and PAMS) represent deployments occurring since 1993 and reflect a shift toward separating monitoring resources from general program planning functions performed by Grantees. Prior to the PAMS program, implemented in the early 1990's, Section 105 funds for traditional criteria pollutants were not delineated in the total STAG agreements. Even greater accountability relating monitoring resources with monitoring outputs was fostered with the use of Section 103 resources to deploy the $PM_{2.5}$ network starting in 1999 and continuing today. This trend was carried on in 2000 with the deployment of the National Air Toxics network. Generally speaking, the use of Section 103 allows for a more efficient tracking of resources as agencies are not required to match Federal Grants. The sub units within State and local agencies responsible for conducting monitoring tend to favor the Section 103 funds as they clearly are earmarked to support monitoring activities. Given the overall change implied by the Strategy, it is imperative that a solid base of Section 103 resources serve as a basis for supporting both the stability of monitoring agencies as well as the needed change in monitoring approaches. Consideration should be given to moving all monitoring related resources to Section 103 or, minimally, delineate clearly the Section 105 resources allotted for monitoring activities to improve accountability.

The CASTNET network is managed centrally by EPA's Office of Air and Radiation with the specific objective of tracking deposition patterns of major power generating emissions sources, the majority being located east of the Mississippi River. The discussion below will address how these existing funding bases will be adopted to support implementation of NCore.

Table 11-1. Approximate FY04 Annual Distribution of Monitoring Funds on a Network Basis.

Network	Budget ($ millions)			Notes
	STAG (103)	STAG (105) Fed Share	EPA Funds	
PM2.5	42.5	1.25		$1.25M in Section 105 for IMPROVE
Toxics	10	6.5		
PAMS		14		All Section 105- assume 50% matching
CASTNET			4	All EPA S&T funds to contractors
Criteria pollutants (Not including PM2.5)		100		All Section 105- assumed 40% matching; large uncertainty range with little formal tracking within 105 program that delineates monitoring from the program activities
RPO supplements	$Unknown			No resources
Total	**52.5**	**121.75**	**4**	**174.25** Total Federal share of STAG funds

Table 11-2. Distribution of $PM_{2.5}$ Resources (All Section 103 Grants unless noted otherwise)

Network component	$Millions	Notes
FRM operations	21.7	(Includes 0.5M tap for filters)
Continuous mass	3.8	
Speciation (field)	4.9	
Speciation (lab)	7.1	(6.7M through National Laboratory contract)
IMPROVE Section 103	3.1 (normally 3.7)	(for FY04 IMPROVE was underfunded by 600k to utilize carryover funds)
IMPROVE Section 105	1.25	
PEP (national QA)	1.9	
Total	**43.75**	

11.3.2 Example Shifts in STAG Allocations.

The current funding base for the networks is used as an example of how funding could be reallocated across measurements to support implementation of the strategy. ***The suggestions below are illustrative only, and do not reflect an EPA budget proposal.***

a. $PM_{2.5}$. The $42.5M in Section 103 STAG funds support the ongoing operations and maintenance of the PM2.5 network. Note that the majority of resources (Table 11-2) support $PM_{2.5}$ FRM measurements and the collection and analysis of chemical speciation data. The principal objectives of the FRM measurements and speciation data are to support designations of

attainment/nonattainment areas, and the development of national emission reduction strategies and SIPs. In large measure, these objectives have been attained as the Agency is releasing designation recommendations based on the FRM data collected from 1999 through 2002, and has completed most of the technical analyses supporting major national programs such as the Interstate Air Quality Rule (IAQR). The SIP technical analyses will be based on the 2000-2002 time frame, attendant with the base emission inventory and air quality modeling analyses supporting attainment demonstrations.

As we move beyond this intensive period of analysis focusing on the current state of the environment, the networks need be more supportive of a longer range vision consistent with the NCore network. The focus of the networks should evolve toward characterizing changes effected by national air quality related programs and SIPs (i.e., measuring accountability), providing an infrastructure for public health advisories (AQI through AIRNow) and support for health effects and exposure studies that feed into periodic evaluation of health standards. Accordingly, resources need to be shifted to assess the progress of implementation plans to ensure that the billions of dollars in resources required to reduce $PM_{2.5}$ levels are reaping observable benefits. And, in the event progress is not being achieved as planned, the networks must be able to support restructuring or "mid course" corrections over the next ten to twenty years. These more forward looking objectives that explicitly serve the $PM_{2.5}$ program benefit from a multiple pollutant network consistent with the NCore design. Consequently, the funding base needs to be reconfigured consistent with the design of NCore, which relies on appropriately divesting in areas of the current $PM_{2.5}$ monitoring system that have served their current primary objective.

Consistent with these future needs it is proposed that FRM and speciation program resources be shifted to continuous and multi-pollutant measurement systems. (See Table 11-3) This proposed resource shift should address most resource requirements to implement the NCore Level 2 and 3 components. Note that there is overlap across criteria pollutant programs and NCore, as there is a large amount of repackaging the existing NAMS/SLAMS structure into NCore. Annual funding for $PM_{2.5}$ FRM network should be reduced from $21.7M to $10.7M, and funding for the speciation program in its current form reduced from $12M to $8M. This implies that the current $PM_{2.5}$ FRM monitoring be reduced by approximately 50%, and speciation monitoring by approximately 33%. The network review process should identify those sites to be reduced. The $14.7M in reduced current resources would be redirected to:

- add more continuous $PM_{2.5}$ monitors
- support the NCore Level 2 multi-pollutant sites,
- enhance the ITT infrastructure in the networks and the capital expenditures for hardware and site improvements to accommodate additional samplers and NCore level 2 sites, and
- support training and QA needs arising from modification of network operations.

b. Air toxics. The air toxics program is entering its first year of new funding base of $16.5M (i.e., $10M in Section 103; $6.5M in Section 105 STAG). As this program is under development, there is no recommended change in resource needs at this time. Please refer to the Air Toxics Implementation Plan: http://www.epa.gov/ttn/amtic .

c. PAMS. PAMS requirements have been scaled down to allow for more specific special studies of interest by local area/regions. The current $14M Federal 105 STAG contribution to PAMS should be reduced to $12M, an amount sufficient to cover the revised, minimum PAMS monitoring requirements. There has been a wealth of data collected from the PAMS program, but very limited and often sporadic analysis and interpretation of the data. To address this gap and yield value from the PAMS data bases, $0.5M will be set aside for analysis of the PAMS data. Ideally, this $0.5M should be combined with additional data analysis resources set aside for air toxics (approximately $400K) and proposed for $PM_{2.5.}$ A steering group of SLTs and EPA participants will establish a plan for this analysis that can include an allocation of these resources to SLTs or to other analytical groups. The remaining $1.5M will remain in STAG but serve as a funding base for quality assurance and training for all air quality programs. Matching contributions to this $12M 105 Grant are used for ozone precursor studies at the discretion of EPA Regional Offices and participating SLTs.

d. CASTNET. CASTNET is the only routinely operating air monitoring network managed by EPA headquarters. CASTNET was designed to assess deposition impacts associated with major power production facilities located in the Midwest and Eastern portions of the country. CASTNET should be perceived as a model network that successfully addresses the NCore accountability objective for tracking national air quality program progress in the rural Eastern United States where siting conditions are relatively free of urban "noise" that can compromise trends analyses. In addition, CASTNET provides a more science-oriented approach as the program has taken important strides toward integrating with other science based networks, including AIRMON, NADP, and IMPROVE. While CASTNET provides an excellent framework to support the national strategy, there remains a number of technological and measurement upgrades necessary to provide greater benefits nationally. CASTNET must be considered an integral component of the larger system of networks and can assist the Strategy in the following areas:

- A subset of CASTNET sites should be assigned NCore Level 2 status to address gaps in rural multi-pollutant monitoring stations.

- A subset of CASTNET sites should be elevated to serve as a test bed of special studies to evaluate emerging technologies that have potential for routine use in network operations, thus meeting some NCore Level 1 objectives. The focus of such technologies would be on those measurements (e.g., ammonia, nitric acid, major aerosol ions, trace gases) that support accountability and model evaluation analyses. This aspect is especially important as the desire to accommodate new technologies must be achieved carefully and in balance with historical techniques so as to maintain a credible record of pollutant trends that reflects shifts in atmospheric conditions and not in technologies.

- The existing contacts and user groups associated with CASTNET should be utilized as a larger integrating vehicle that promotes greater communication and coordination across networks focused on ecosystem and public welfare. The NADP-CASTNET sponsored workshop on ammonia (Washington, D.C., October 2003) provides an example of bringing together those responsible for managing ecosystem-based and public exposure networks.

Given the escalating costs of operations continued with these new demands, the CASTNET budget should be elevated from $4M to $5M annually using non-STAG funds [note that such an increase should be considered a secondary priority to NCore Level 1 funding].

e. Data analysis and interpretation. The value of the data collected from the multi-million dollar monitoring program is undervalued without an appropriate analysis and interpretation component. The CASAC Subcommittee criticized EPA's lack of organized archival processes, as well as access to and analysis of air quality data. These issues are discussed in more depth in Section 12. By allotting resources annually to data analysis and interpretation, sufficient funding would be available to make at least adequate use of the data, enhance information transfer, and provide a higher order of quality control and network assessment that emerges from data reviews and analysis. This specified resource allotment would take a very integrated perspective across pollutant categories and catalyze numerous local and other specific topic based analyses. Details of procedures for manging such an effort need to be worked out. Perhaps, a steering group of SLTs and EPA participants would establish a plan for this analysis that can include allocation of these resources to State and local agencies or to other analytical groups. The PAMS analysis effort is separated in recognition of the need to review a decade worth of PAMS data that has largely been neglected. In one to three years, the PAMS analysis component would be incorporated as part of the national analysis. This committee could take positive steps in improving the data archiving/access/distribution issues raised by CASAC, as a precursor to improving data analysis capability nationally. To promote scientific input to this process, thought should be given to having a dedicated CASAC subcommittee focusing on this data analysis component of the networks. Some examples of data analysis capacity building follow.

(i). Regular analysis for status and trends of criteria and air toxics air quality. The large amount of data being collected in the monitoring networks, along with important supplementary data (e.g., meteorological, remote sensing and QA data), will allow air program managers to adjust ongoing activities/decisions and explore new aspects of air pollution as they occur. For these data to be useful for managers, they must be analyzed on a regular basis for a complete set of measures, including detailed characterizations and specific progress or trend measures. In parallel and perhaps more imporatntly, a "tool set" to facilitate analysis should be developed to deliver data on annual, seasonal, near-term, and real time bases appropriately for various air pollutants across various spatial domains. The products would be based on a variety of techniques from simple temporal trends to complex spatial interpolation and would be useful at the national, regional, state and local levels. This approach would develop, for the entire air program, a set of analytical products anaologous to those developed for the visibility program (e.g., VIEWS website ***http://vista.cira.colostate.edu/views/*** developed under the Regional Planning Organizations). A "dashboard" website would be needed for viewing regular updates and access to useable products; thus the need for automation of the basic tool set. In addition to the basic tool set, this approach would expand the tool set to new tools as special studies produce operational techniques and would work to identify unusual air quality events to study or address in the context of public health tracking.

(ii) Special studies on technical and policy relevant topics. Monitoring and air quality data (technical and analytical) uncertainties and limitations may affect policy decisions. Based on data from NCore and other monitoring sites, these topics should be investigated through

special studies. These studies would include a number of topics. An assessment of major programs (and their effectiveness), such as the NOx SIP call and the IAQR and the various approaches to reduce ozone concentrations, would be undertaken to provide insights into these programs with the potential to adjust those programs periodically. An investigation of multiple pollutants affected by independent control program elements (PM, ozone, air toxics) would advance the ability to "co-control" pollutants and avoid shifting air quality problems across programs (e.g., increasing air toxic emissions in response to VOC controls). A thorough study of "exceptional" and "natural" events is needed to provide a factual basis for the proper exclusion of data from program decisions. Along these lines, source attribution studies would be undertaken to inform regional and specific issue decisions. In addition, studies to evaluate the quality and uncertainties associated with collected data and special characterization of monitoring sites would be undertaken, and the collective information providing a dynamic feddback into network design.

(iii) Building air quality data analysis tools and capacity. Broadening the capacity for analyzing air quality data facilitates greater engagement, and adds analytical and quality assurance power to the entire network measurement and design process. With expanding detail in monitoring data and the need to understand air quality issues better, analytical tools have become complicated and complex to use. Techniques such as back trajectory; source apportionment; assimilation of satellite, monitoring and monitoring data have great potential to advance the ability to understand the progress of the Nation's efforts to address air quality problems. Guidance is needed for a range applications including network assessments and design, emissions inventory and model evaluation, conceptual model building (e.g., genesis and attributes of air quality problems) and observational models (source attribution and emissions strategy tools), as well as a spectrum of more direct regulatory problems. As special studies are completed by EPA, SLT, and regional analysts, there will be a need to develop new operational tools for the analytical techniques developed within the study. Accordingly, "how-to" instructions to aid in the use of existing and new tools would be developed and distributed. Specific special tools would be developed, evaluated and otherwise made available, as the need arises, to provide the analytical capacity needed to implement air programs. Efforts to bring knowledge developed within the research communities to practicing analysts would be undertaken. For example, an annual conference for data analysts, as well as a virtual homepage for the Nation's air quality data analysts, could be developed to facilitate communication among analysts for expanded understanding of tools and exchange of ideas on monitoring and data analysis topics.

f. Quality Assurance. As explained in Section 7, the monitoring regulations require State and local agencies to include independent performance evaluations to complement the more routine quality control efforts conducted by SLTs. Funding of these programs has not been consistent and has been provided from different funding sources (103 STAG for the $PM_{2.5}$ PEP and EPA funds for the NPAP programs). A recommendation for more centralized QA was forwarded by the CASAC NAMS Subcommittee in the interest of ensuring data comparability across different geographic sections of the Nation. The quality assurance subcommittee, comprised of SLT and EPA members, proposed using existing STAG resources to fund this critically important element. Accordingly, the national performance evaluations should be managed as a combined entity covering criteria and NCore Level 2 measurements. The recommendation to allocate an additional $1.3M beyond the $2M assigned to the PEP would

cover all national QA costs for independent audits of NCore Level 2 measurements and NAAQS measurements at NCore Level 3 sites. A small fraction ($100K) of these resources would be reserved for the national equivalency program charged with reviewing and approving instruments used for NAAQS measurements.

g. Training and Guidance. As mentioned earlier, training and guidance documents will be required for new types of monitoring instruments, information management technology, and quality assurance techniques. Approximately $200K per year (average over FY05-FY07) of STAG funds has been allocated to provide the necessary capital equipment and training needed for the monitoring strategy. Details of training and guidance development are found in Section 11.4

11.3.3 Identified and Anticipated Needs Exceeding Current Base Programs.

a. PMcoarse monitoring. EPA will be proposing new PM air quality standards that will include requirements to measure coarse particulate matter [$PM_{(10-2.5)}$]. The Agency expects that new continuous technologies will be used to measure $PM_{(10-25)}$ with attendant capital, operational and training expenses. The bulk of new requested resources should be directed at initial and recurring equipment and non-salaried maintenance costs (i.e., parts and replacements), and training. Divestment in operator time for related programs such as PM_{10} should provide an available workforce for $PM_{(10-2.5)}$ monitoring. Although the scope in terms of numbers of sites and locations is not known at this time, it is assumed that the projected sum of $PM_{(10-2.5)}$ and remaining PM_{10} sampling will be equal to or less than the current PM_{10} operational load. There will be recurring no-salaried costs for equipment repairs/upgrades and laboratory expenses for chemical speciation. Accordingly, a modest request of $10M STAG resources initially to be scaled down to $5M after three years is proposed to meet expected demand for $PM_{(10-2.5)}$ sampling.

b. NCore Level 1. The CASAC NAMS Subcommittee and SLT's have advocated the need for Level 1 sites to improve our ability to adopt advanced technologies and interface more effectively with the research community at a practical applications level. The STAG resources must remain within the SLT entities to provide the stable workforce for meeting monitoring needs. Less clear is a resource approach to fund NCore Level 1 sites needed to provide the technology interface with advanced technologies and the research community. While some capable SLT's will operate near Level 1 sites (e.g., the MANE-VU rural sites), the Level 1 program ideally provides resources to academic institutions and firms that are leaders in methods development and associated leaders in analysis of data. A recommendation is that $10M annually in EPA's Science and Technology funds be identified to support Level 1 operations.

c. CASTNET. As mentioned in Section 11.3.1, the CASTNET budget should be elevated from $4M to $5M annually.

11.3.4 Summary of Proposed Budget Changes

A compilation of the proposed changes discussed in this subsection are delineated in Table 11-3.

Table 11-3. Proposed summary of redistributed Federal resources. (All STAG funds except where noted)			
Program	**Current**	**Proposed**	**Comments**
$PM_{2.5}$ FRM	21.7	10.7	Assume a 3 year transition
$PM_{2.5}$ continuous mass	3.8	10.1	Assume a 3 year transition and absorb costs for ITT enhancements for all networks
$PM_{2.5}$ speciation	12	8	Retain all trend sites and reduce non trend sites from 160 to 80; assume three year transition
IMPROVE	4.35 (4.95)	4.95	IMPROVE network serves as core rural speciation trends network; needed network adjustments are handled effectively through IMPROVE Steering Committee and related RPO committees. IN FY04 IMPROVE was underfunded by 600K to utilize carryover funds.
PAMS	14	12.5	The revised PAMS requirements are estimated to require less than the assumed $25 total of Federal and State matching funds. Remaining funds are to be used to allow flexibility for studies tailored to city/region specific airsheds. $0.5M dedicated to analysis.
Toxics	16.5	16.5	Emerging program under development
CASTNET	4	5 (1)	Increase agency S&T funds $1M
criteria pollutants/ NCore Level 3	100/0	50/50	NCore Level 3 measurements are viewed as a subset of many of the existing criteria pollutant measurements. The 50/50 split reflects a balance between maintaining flexibility for State/local agencies to engage in special purpose monitoring outside the scope of NCore. This is a very rough estimate as there is extensive overlap between Level 3 and "local flexibility" needs. In addition, the $20M PM mass (FRM and continuous) are considered part of the NCore Level 2 and 3.
NCore Level 2	0	4.5	Recurring equipment and operating expenses associated with new measurements, enhanced data delivery and expanded platforms.
NCore Level 2 (Sentinel sites)	0	1.0	Recurring equipment and operating expenses associated with new measurements, enhanced data delivery and expanded platforms at continental boundary locations and reserved for non S/L/T organizations.
PMcoarse	0	***10***	This does not come from a redistribution, but reflects a modest request in increased STAG 103 anticipation to meet requirements set forth in the new PM standards.
NCore Level 1	0	***10***	This is not a redistribution within existing STAG programs, but a new request that should be agency S&T funds.
QA	1.9	3.2	1.3 M addition for performance evaluation (Table 7.3)
Training	0	0.2	Table 11.5 (average over 3 years FY05Y07)
Data analysis/interpretation	0	2.2	
Total STAG EPA	174.25 ***4.0***	174.25 ***25.0***	Shaded areas not included in total. The values track with the STAG totals listed in Table 11.1

11.4 Training and Guidance for SLT Agencies to Transition to New NCore Measurements.

The transition to the NCore network creates a need for training that addresses new methods, information transfer technologies, and an effective quality assurance program. There are five areas where some type of training or a transfer of information on the Strategy is required. These five areas are segregated into programmatic and technical areas as follows:

- **Programmatic**
  Monitoring Strategy- Overall concepts
  Network Development/Assessment

- **Technical**
  Methods Implementation
  Information Technology
  QA

The majority of the resources allocated to training and guidance will be directed towards the technical areas. These areas lend themselves to the following variety of training mechanisms:

- **Satellite Broadcasts and Videos (DVDs)** - This can provide broad to semi-detailed information about a topic and is used to provide an initial exposure to the area, concepts and rationale for the direction or procedure, time line for implementation and where one would get more detailed information and training. These formal presentation of the topic areas will be developed on DVD and distributed through the OAQPS Education Outreach Group.

- **Hands-on Sessions** - Formal detailed instruction on a particular area.

- **Guidance Documents** - Written guidance providing the necessary detail for an area when possible and generic guidance and suggestions when more than one alternative exits.

- **Vendor-** Training that particular vendors of instrumentation or information technology systems would provide.

- **Web-based training** - Training developed through software that can be posted on the internet.

- **Workshops-** National, Regional or local workshops where various training activities could be presented.

Table 11-4 provides the training mechanisms that will be proposed for the programmatic and technical areas.

Table 11-4 Training Mechanisms						
Area	Training Mechanisms					
	Satellite Broadcasts	Hands - On	Guidance Documents	Vendor	Web Based	Workshops
Monitoring Strategy	✔					✔
Network Development/Assessment	✔		✔			✔
Methods	✔	✔	✔	✔		✔
Information Technology	✔	✔*	✔	✔		✔
QA	✔	✔*	✔		✔	✔

* Information technology and QA training would be incorporated as needed in methods hands-on training activities.

11.4.1 Monitoring Strategy- Overall Concepts Training

Information on the overall concepts of the Monitoring Strategy and its implementation will be conveyed primarily through the Strategy document. However a satellite broadcast of the Strategy will be developed to cover the major concepts of the strategy, and EPA personnel will be available for invited presentations at workshops.

11.4.2 Network Development and Assessment Training

Periodic network assessments are needed to establish and maintain optimum air monitoring networks. Guidance and training materials are needed for future network assessments to provide more structure to the assessment process. The guidance is intended to promote greater national consistency while allowing for flexibility due to the substantial differences among the regions.

As Table 11-4 illustrates, three types of methods training are proposed:

- **Satellite Broadcasts and Videos (DVDs)** - A broadcast module on network assessment will be developed by OAQPS staff. This will provide an overview of the network assessment process, outline roles and responsibilities, and provide a summary of useful statistical techniques. Information on where to go to get more detailed information and training will also be included.

- **Guidance Documents** - EPA is developing a guidance document for use by Regional Offices in conducting network assessments. In addition to providing an overview of the network assessment process, the guidance will provide detailed information on the statistical and other techniques to be used.

- **Workshops**- OAQPS will either host a national meeting or incorporate a network assessment workshop into an appropriate national meeting. Network assessment training would be incorporated into these meetings.

11.4.3 Methods Implementation Training

EPA is enhancing its current on site monitoring platform in RTP, NC to raise the site to a basic Level 2 configuration. The motivation for this effort is to provide a headquarters contacts expert in operations of the trace gas instruments and information transfer technology in order to better gauge the issues and needed actions associated with implementing the technical aspects of the Strategy. Operation of trace gas instruments includes challenges associated with interferences of water vapor, need for frequent zeroing of baseline signal, and, with respect to NOy measurements, attention to sample line losses, conversion efficiencies and calibration approaches. The burden associated with frequent baseline zeroing should be reduced with remote capability provided by expanding ITT services.

Methods Implementation Training will include the following elements:

- Introduction- data uses- specific challenges- interferences
- Equipment Needs
- Initial monitor checking
- Set-up
- Calibration
- Maintenance
- Data Capture/Transfer
- QA/QC
- Data verification/validation/assessment

As Table 11-4 illustrates, five types of methods training are proposed:

- **Satellite Broadcasts and Videos (DVDs)** - A broadcast module on methods will be developed by OAQPS staff that are researching the implementation aspects of the methods in FY03-04 at the Air Training Facility (ATF) platform. This can provide broad to semi-detailed information about a topic and is used to provide an initial exposure to the area, concepts and rationale for the direction or procedure, time line for implementation and where one would get more detailed information and training.

- **Guidance Documents** - A technical assistance document (TAD) on the NCore Level 2 trace gas methods will be developed by late FY04 or early FY05. This TAD will include generic SOPs. Written guidance will be provide the necessary detail for an area when possible, and generic guidance and suggestions will be provided when more than one alternative exits.

- **Formal Hands-on Training** - Formal hands on training will be scheduled each year at the RTP and Las Vegas ATF using contract support (similar to PM Speciation Program). In FY05 one training session will be scheduled in RTP and will be dedicated to the NCore Level 2 pilot site operators (12 sites), and the site operators at the four pilot sites in the CASTNET program. In FY06 and 07 four formal sessions will be scheduled at the ATF facilities and funding for three additional training activities at local venues (e.g NESCAUM) will be secured.

- **Vendor Training -** OAQPS will invite vendors to attend national meetings and workshops as well as hands-on training activities. However no funding will be provided for vendor attendance. However, SLTs, as part of the bidding process for equipment should include hands-on training in the bid request if they so desire this training.

- **Workshops-** OAQPS will either host a national meeting or incorporate a major monitoring strategy workshop into an appropriate national meeting. Methods training would be incorporated into these meetings.

11.4.4 QA Training

Some discussion of QA training is included in Section 7. QA Training will include the following elements:

- EPA QA Policy
- Performance Based Measurement Concept
- Data Quality Objective Process
- Data Quality Indicators and Measurement Quality Objectives
- Audits and Performance Evaluations
- Data Verification & Validation
- Data Quality Assessments
- QA Training (certification/accreditation of QA leads described in section 7)

As Table 11-4 illustrates, five types of QA training are proposed:

- **Satellite Broadcasts and Videos (DVDs) -** A broadcast module on QA will be developed by OAQPS staff. This broadcast will provide a broad overview of the elements that make up the quality system, the changes or additions that were made to the CFR, and how these affect SLT monitoring and QA community.

- **Guidance Documents** - The major QA guidance document will be the QA Handbook for Air Pollution Measurement Systems Volume II Part 1. This will be revised in FY04 and FY05. A TAD on the NCore Level 2 trace gas methods will be developed by late FY04-early FY05. This TAD will include generic SOPs. Written guidance will provide the necessary detail for an area when possible, and generic guidance and suggestions will be provided when more than one alternative exists.

- **Formal Hands-on Training** - Formal hands on training for QA will be incorporated into methods training and will not be developed as stand alone training course. However, OAQPS will revise training material used in the Air Pollution Training Institute course "Quality Assurance for Air Pollution Measurement Systems" (APTI 470).

- **Web-based Training-** Due to the travel restrictions at a number of SLT's, it is difficult acquiring some of the QA training needed. Starting in FY06, OAQPS will develop a number of web-based training modules related to the elements listed above.

- **Workshops-** OAQPS will either host a national meeting or incorporate a major Strategy workshop into an appropriate national meeting. QA training would be incorporated into these meetings. In addition, QA training will be included at the national QA annual meeting where for the past 3 years ambient air monitoring sessions have been facilitated.

11.4.5 Information Technology Training

Information Technology Training includes the following elements:

- Introduction and overall concepts
- Performance needs for NCore
- Hardware and software considerations
- Telemetry options
- Incorporating data Validation
- Meeting AIRNow and AQS reporting needs
- Moving to XML as a common format

As Table 11-4 illustrates, four types of methods training are proposed:

- **Satellite Broadcasts and Videos (DVDs)** - A broadcast module on Information Technology will be developed by OAQPS staff that are researching this implementation area. This would cover areas such as the major concepts, performance needs, equipment considerations, telemetry options, data validation, reporting needs, and movement to a common XML format. Detailed discussions on individual data management systems are not expected to be covered in this forum.

- **Guidance Documents** - As appropriate the QA Handbook for Air Pollution Measurement Systems Volume II Part 1 will be revised to reflect the guidance of how IT systems are to support ambient air monitoring programs. This will be revised in FY04 and FY05.

- **Vendor Training -** OAQPS will invite vendors to attend national meetings and workshops as well as hands-on training activities. However, no funding will be provided for vendor attendance. However, SLT, as part of the bidding process for equipment should include hands-on training in the bid request if they so desire this training.

- **Workshops-** OAQPS will either host a national meeting or incorporate a major Strategy workshop into an appropriate national meeting. A module on information technology will be incorporated into these meetings.

11.4.6 Summary of Training Needs

Table 11-5 identifies the training and guidance activities, resource needs, potential sources of funds, and a timeline for implementing the activities. Guidance development is an inherent EPA responsibility for which non-STAG resources should support.

Table 11-5 Training/Guidance Resource Requirements and Timeline

Training and Guidance					
Year (FY)	**Technical Area & Activity**	**Cost (K)**	**Source**	**Date**	**Comments**
04	**Network Assessment**				
	Draft guidance document	0	EPA	9/04	Developed by EPA staff.
	Methods Technical Assistance Document	100	EPA	9/04	Developed by OAQPS staff with contractor support (important to get contractors involved if they will be used for methods training)
	QA QA Handbook	0	EPA	9/04	Redbook. Developed by OAQPS staff
Tot.		**100**	EPA		
05	**Network Assessment**				
	Final guidance document	20	EPA	7/05	Contractor support for final review process
	Satellite Broadcast	20	EPA	6/05	Develop concurrent with final guidance.
	Methods Methods Revision	10	EPA	11/1/04	Revisions - based on insights gained from Pilot work
	Hands-on Training	20	STAG	11/30/04	1 session for NCcore Level 2 Pilot station (12) operators in RTP. Limited attendance
	Equipment Purchase	150	STAG	2/05	Trace gas equipment and shelter for Las Vegas Facility. Equipment could be transferred to SLT after CY07
	Satellite Broadcast	20	EPA	6/1/05	Mid FY 05 after gaining some insight from Pilot Studies but early enough to help personnel prepare for CY06
	QA QA Handbook	15	EPA	11/1/04	Completion of document.
	Satellite Broadcast	20	EPA	8/1/05	Mid FY 05 after gaining some insight from Pilot Studies but early enough to help personnel prepare for CY06

Table 11-5 Training/Guidance Resource Requirements and Timeline					
Training and Guidance					
Year (FY)	**Technical Area & Activity**	**Cost (K)**	**Source**	**Date**	**Comments**
Tot.		**275**	(105K EPA, 170 STAG)		
06	**Methods**				
	Methods Revision	10	EPA	11/1/05	Revisions - based on insights gained from Pilot work
	Hands-on Training	80	STAG	11/05 5/06	4 session for new operators in CY06 1 session each in RTP and Vegas in 11/05 and another 2 session 5/06 and additional funds for 3 sessions provided by invitation
	QA APTI 470 Revision	30	EPA	5/05	Revisions - based on insights gained from Pilot work and implementation of the Monitoring Strategy
	Web-Based Training	30	EPA	6/06	
	Data Validation Development	260	EPA	8/1/05	Utilizing the current data validation templates, the experiences learned in the pilot study and general good practices for data validation a "cookbook" will be developed to provide clear and easy to implement instructions for data management systems to validate data. This will include attempting to work with the data management companies to provide software upgrades as necessary for implementation of data validation.
Tot.		**410**	(330K EPA, 80 STAG)		
07	Methods Revision	10	EPA	11/1/06	Revisions - based on insights gained from Pilot work
	Hands-on Training	80	STAG	11/06 5/07	4 session for new operators in CY07 1 session each in RTP and Vegas in 11/05 and another 2 sessions 5/07 and additional funds for 3 sessions provided by invitation
Tot.		**90**	(10K EPA, 80K STAG)		

11.5 Leveraging: Integration Efforts with Other Networks and Organizations.

The CASAC Subcommittee's report recommended increasing integration with other organizations and networks outside of the traditional SLT monitoring programs funded through STAG resources. Opportunities exist to provide and receive reciprocal benefits from established networks and organizations that are more focused, for example, on ecosystem welfare or atmospheric processes, relative to the public exposure emphasis in the traditional monitoring networks.

Effective integration practices that enhance network economies and overall value need to be pursued. However, some skepticism should be acknowledged before engaging in a large scale integration exercise. To date, the Strategy has benefitted from a relatively narrow scope of participants allowing for a well-focused effort with stakeholders knowledgeable of the program and genuinely concerned about its future, without the benefit of a specific budgetary need or regulatory mandate. While the intent to integrate has merit, there is no clear, compelling benefit to individual organizations to participate as the true benefit is holistic in scope encompassing a universe of potential users where "greater" good is derived for all, but the individual payback likely perceived to be so small as to stifle any worthwhile engagement. Furthermore, many air agencies cannot go beyond their charters which involve only air quality. As long as air quality measurements can be integrated into ecosystem needs, rather than dictated by ecosystem needs, there should not be conflicts with respect to air agency goals and directives.

Given this context, it is imperative to proceed along a fairly proactive pathway with modest and achievable objectives to maximize engagement. The following actions are designed to facilitate greater network integration:

- **Addition of Ecosystem Support as NCore Objective.** The CASAC Subcommittee requested that the Strategy adopt a more proactive approach toward incorporating ecosystem welfare issues. Support for ecosystem welfare assessments has been added as an NCore objective, a needed precursor for subsequent integration efforts.

- **NCore Level 2 Siting**. A starting point to foster this integration can be coupled to a design effort that needs to be maintained over the next three years covering NCore deployment. Numerous issues will arise related to site selection and measurement needs that will benefit from better communications across networks and organizations. For simplicity, three disciplines (ecosytems, health, atmospheric processes) are separated as they often are atributed with different objectives, participants and perspectives yet share in some instances significant commonalities in data. A simple example of how such outreach can benefit these disciplines is the siting associated with NCore Level 2 (and 1). A listing of cities that are most likely targets for long term epidimiological studies would allow EPA and the States to priortize deployment of NCore Level 2 sites before States commit to a location not desired for such a purpose. Interaction on Ecosytem Assessment and Atmospheric processes support will be solicited primarily through interactions with the Air Quality Research Subcommittee (AQRS) of CENR. Similar dialogue on health effects and exposure research support will utilze EPA's existing relationship with the Health Effects Institute (HEI). Internally, EPA's health effects, toxicological and exposure scientists will be actively engaged in siting discussions. Within EPA, a specific design team consisting of OAQPS and ORD scientists will provide siting recommendations based on technical needs associated with national scale model evaluation and data analysis objectives.

- **CASTNET Pilot Study**. EPA's Office of Air and Radiation manages the CASTNET network which provides a conduit to the atmospheric deposition and ecosystem assessment community. With certain exceptions, there has been only limited coordination between the CASTNET and the national networks operated by SLT's. Over the last four years, integration with networks has been supported by the addition of IMPROVE $PM_{2.5}$ speciation monitors at eight CASTNET sites. Starting in late 2003, a pilot study was initiated to establish three advanced monitoring sites at CASTNET locations to test new continuous speciation technologies and trace gas instruments. These three sites may become rural NCore Level 2 sites or NCore Level 1 sites, and also provide some minimal technology transfer support.

- **Increased Coordination with National Atmospheric Deposition Program (NADP).** These positive steps taken to assimilate CASTNET measurements into the SLT national networks provides an important linkage both to the NADP

networks: the National Trends Network (NTN), AIRMoN and the MDN. Several CASTNET sites share locations with NADP sites. The MDN will provide enormous value to the nation as it is the only infrastructure in place to monitor mercury on a routine basis.

- **Increased Integration with the PBT Monitoring Strategy and Emerging Mercury Monitoring Needs.** EPA has developed a series of recommendations, http://www.epa.gov/ttn/amtic/, to increase our ability to characterize persistent and bioaccumulative toxics (PBT) that include mercury, dioxins and persitent organic pollutants (POPs). In addition, the Agency has been working on a mercury emissions reduction rule that eventually will require ambient gaseous measurements in combination with precipitation and fish tissue mercury data. Currently, gas phase measurements are technically demanding and cost prohibitive to be instituted routinely. However, there are existing linkages between the MDN and CASTNET which could evolve in more comprehensive mercury measurements that are linked with a suite of pollutant measurements within the NCore framework.

- **Allocation of NCore Level 2 Sites as Sentinel Sites for International Transport**. Recognizing the increasing importance of contributions from global scale intercations, the NCore network should include an explict measurement linkage that addresses international pollutant transport. Such a linkage can be established through integration with PBT measurements which often are impacted by Global scale transport phenomena as well as though Sentinel sites located at key inflow and outflow locations near the coastlines and elsewhere. A fraction of NCore Level 2 resources are recommended to be set aside for such Sentinel sites.

- **RPOs.** The RPO's were established to focus on regional haze issues from a regional perspective, recognizing the technical need for addressing haze across numerous geographic and demographic boundaries. The RPO's have made important contributions to the nation's networks, as several key gaps across the nation have been filled by IMPROVE monitors based on the regional perspective taken by RPO's that may not have been accomplished through traditional SLT design needs. The RPO's provide a very sound technical organization that coordinates across SLTs and EPA and provides key support to the Strategy by:

    - adopting a multiple pollutant monitoring approach to address regional haze,

    - conducting field testing of advanced continuous PM speciation instruments, and

    - operating rural/regional sites that could qualify as NCore Level 2 sites.

- **Addition of ammonia and nitric acid to NCore Level 2 list**. Nitrogen is a critical environmental pollutant as it is a major player in atmospheric processes that impact secondary particle and ozone formation, and has substantial impacts

on eutrophication and acidification of the nation's watersheds. The addition of nitric acid and ammonia as key national measurements benefits the health effects, atmospheric process and ecosystem welfare communities.

- **Increased communications with exposure and health effects research community and HEI.** The PM Supersites program included support for health effects and exposure research as one of three primary program objectives. As the program winds down, continued efforts must be pursued to ensure that the networks are responsive to the needs of health effects research community. While the NCore Level 2 design is based, in part, on supporting long term epidemiological studies, there still needs to be an effective communications mechanism to increase support to this community. Recent efforts by HEI have incorporated the national networks as part of their ongoing agenda. EPA and HEI should continue to pursue opportunities for integration. More specifically, EPA should engage active researchers in the health effects community and have a substantive meeting addressing important locations (e.g., those cities with planned long term studies) to help prioritize NCore Level 2 sites and comment on the NCore Level 2 parameter list. Additional attention also needs to be given to the proposed "daily" speciation sites which evolved into approximately 10 continuous speciation sites as discussed in Section 6.

- **NARSTO.** NARSTO always has considered the nation's air monitoring networks as a key infrastructure component upon which complementary special intensive field programs provide a rich base of data for understanding atmospheric processes. The NCore Level 2 design follows this construct; clearly, the NARSTO organization should be more engaged in supporting network design and understanding network outputs.

- **CENR/AQRS.** The AQRS of CENR is a multi-agency (EPA, NOAA, NPS, DOE, DOI, USDA) group positioned to foster integration across a variety air related topics. The AQRS has in the past pursued related inventorying of a variety of monitoring network efforts and generally is well positioned to offer guidance to EPA on effective approaches to integration. The implementation of the Strategy has been added to the AQRS agenda for 2004.

11.6 Network Deployment

Deployment of a full NCore Level 2 network will be phased in over a three year period (See Table 11-6), preceded by pilot programs to develop practical experience and knowledge of issues prior to a large scale network deployment. Three pilot programs were initiated in 2003 and should provide field results by the middle of 2004:

- **Internal EPA-RTP methods facility.** As described above, EPA maintains an monitoring platform for training and to gain experience with various technologies. Currently, this in-house facility is focused on trace gas methods and associated operational and quality assurance issues.

- **Joint OAQPS-OAP CASTNET pilot study.** EPA OAQPS and Office of Atmospheric Program (OAP) staff are funding a pilot study at three CASTNET sites to explore new continuous technologies that would complement the existing filter pack techniques and to leverage the CASTNET infrastructure to establish rural NCore Level 2 sites. In addition to testing continuous ion chromatography instrumentation for major aerosol ions, these sites will be outfitted with NCore Level 2 trace gas monitors.

- **NATTS.** The NATTS will be adding trace level CO instruments at four locations to assess the use of CO as potential surrogate for mobile source hazardous air pollutants. Most of the NATTS will be NCore Level 2 sites and eventually include CO measurements. These four sites are being treated as a pilot program to investigate both methodological issues as well as assessing CO as a surrogate for other measurements. The use of continuous CO data is attractive from a temporal perspective, as virtually all air toxics measurements are conducted through integrated techniques.

In addition to these pilot programs, there exist a handful of other studies being conducted by State and local agencies that will contribute to the knowledge base for addressing issues associated with trace gas measurements.

11.7 Implementation Oversight

Since there are so many implementation details with unknown outcomes, it is prudent for EPA to maintain ongoing oversight tools to ensure that the basic spirit and intent of the Strategy is carried out, and to minimize miscommunication. To date, two committees have served important roles in steering the direction of the Strategy. These include the NAMS steering committee and the CASAC NAMS Subcommittee. A core group of original NMSC members are members of SAMWG.[1] SAMWG meets twice annually, and provides a forum for exchange of technical information and monitoring policy discussions, and is a logical outlet that brings together State and local agency monitoring program leadership with EPA Headquarters and Regional Offices. In addition to providing technical leadership, SAMWG will be particularly valuable in working out many of the implications to agencies associated with funding shifts brought about by the Strategy. The CASAC NAMS Subcommittee met in Summer 2003 and provided useful feedback to EPA, much of which has been incorporated in this document. During that initial meeting, EPA and the Subcommittee agreed to extend the Subcommittee's role to monitor progress during implementation of the Strategy.

11.8 Implementation Schedule

The projected timelines for key actions to implement the Strategy are given in Table 11-6.

[1]SAMWG is undergoing a reorganization and likely to be renamed.

Table 11-6. Implementation Schedule		
Action	**Date**	**Notes**
Monitoring Regulations		
Draft Monitoring regulations	6/04	Large variation in time required to achieve necessary reviews.
Proposed regulations for public review	11/04	
Final regulations	3-6/05	
Level 2 NCore site selection		
Establish outreach mechanisms	3/04 - 4/05	Principal communications through CENR/AQRS on ecosytem and atmospheric process perspectives, and HEI on health effects and exposure.
Initial recommendations from EPA OAQPS, RO's and ORD	3-12/04	engage EPA health and air quality modeling scientists for Ncore site locations
Review and modifications	3-4/05	provide specific NCore Level site locations by 4/05
Level 2 NCore Methods and technology guidance		
EPA acquisition and protocol development	9/03-12/04	In-house purchase of equipment and staff familiarization
Pilot studies	3/04-3/05	At 4 Air Toxics NATTS, RTP, NC and 3 CASTNET locations
Guidance package for trace level gases	4/05	
Level 2 NCore Deployment		
Phase 1: pilot and related sites; approximately 12 stations	1/05	Expect flexibility in dates and numbers, holding fast to three year implementation schedule for Level 2 sites
Phase 2: establishment of ~ 25 post pilot sites in routine operations	1/06	
Phase 3: completion of ~75 stations	1/07	
Network Assessment Guidance	7/05	
Training....see detailed Table 11.5		
Quality Assurance .....see detailed Table 11.5		
Data Analysis		
Data analysis plan	6/05	Joint agency SLT plan on coordinated data analysis program